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EDITORIAL

MEDICAL EDUCATION

THERE is of late a widespread discontent with medical education. During the past twenty-five years there has been a remarkable tendency toward a more scientific basis for medicine. We have been led into the physical, chemical, and physiological laboratory with the idea of giving us a foundation for the accurate appraisal of the phenomena with which medicine deals. The present discontent would seem to emanate from those who regret the separation of the teaching of the sciences from clinical medicine. In most medical schools the first half of the course is preparatory, and the second half clinical. One often hears some of our instructors who have had long experience deploring the fact that the average student does not see such things as skin diseases till the final year. They would have the student introduced earlier to clinical medicine, and taught a familiarity with disease while learning the normal.

In a few quarters one hears an objection to the emphasis placed on fundamental science. We have even heard a clinician say that no therapeutic measure ever came solely from the laboratory. However, we believe that if undergraduate students were allowed to express themselves, very few indeed would object to the preliminary scientific training. In spite of the long time now necessary in the education of a medical man, most students thoroughly recognize the necessity for a scientific basis for medicine. Students do, however, feel that an association with clinical disease might be begun earlier. In all probability, the almost universal process of forgetting anatomy might at least be retarded if a little surgery were taught along with it. A judicious mixture of physiology and anatomy, both gross and microscopic, would make the human structure much more interesting and hence more easily remembered. Anatomy of the nervous system might very well be seasoned with a clinical study of nervous diseases, with emphasis on the localizing signs. If a little more time were spent in learning to read X-ray plates of various conditions, the students would be pleased.

But the process of mixing clinical medicine with fundamental sciences should be very carefully done. 'Twere foolish to precede normality with abnormality in instruction. Pathology can be understood only when compared with the normal. A study of the normal lung is a prerequisite to a study of pulmonary diseases.

The changes made in medical education will be watched with the greatest interest by those who have so recently passed through the "mill." And while most students favor a mixture of basic science and clinical medicine, we feel that such a mixture should be effected with the greatest care and forethought.

ROLE OF CALCIUM IN RICKETS

THE role played by calcium in the disturbed physiology of rickets, though admittedly an all-important one, has long been disputed. The bones in rickets exhibit a marked deficiency in calcium, though it is stated that the calcium content of the blood is very slightly, or not at all reduced. The question arises as to whether the disease consists in deficient absorption of calcium, in inability of the bones to use the calcium which is present, or in the excessive excretion of calcium.

Leonard Findlay, of Glasgow,[1] speaking before the American Medical Association last June, discussed the problem in a very clear way. He holds that there is not an excessive excretion of calcium in rickets, because if the intake be reduced very nearly to zero, the fecal and urinary excretion likewise falls, so that it is not possible to get a negative balance of calcium. Also, if the ingestion of calcium be greatly increased in a case of rickets, the urinary output does not rise, and all the calcium ingested is put out in the feces. From these facts he argues rather that there is deficient absorption of calcium by the alimentary mucosa, since if absorption were normal, the urinary output would be increased by increased calcium ingestion. He considers that ingested calcium is passed through the intestinal canal and never absorbed.

That the calcium content of the blood is quite or nearly normal might be taken to indicate simple inability of the bones to use calcium. The known low phosphorus content of blood might make the body unable to form calcium phosphate. But Findlay argues that diminished absorption of calcium makes it necessary for decalcification of the bones to occur in order that the vital functions of other tissues, to which calcium is essential, may proceed. For instance, bone is robbed of calcium in order that the heart may be nourished with blood containing normal percentages of calcium.

Findlay seems to have shown that calcium absorption is deficient in rickets. In this conclusion he is supported by Orr, of Baltimore. But it would seem that he has inadequately explained the failure of bone cells to use the calcium in the blood. To say it is in order that other tissues may use the calcium is a teleological explanation, and not a true description of what occurs. The low phosphorus content of the blood seems to promise results along this line.

The metabolism of calcium is highly involved, not only in rickets, but in tetany and even in the normal body. Much work may be necessary to elucidate these intricate problems.

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[1] J.A.M.A. 83; 1473. Nov. 8, 1924.

DR. RUDOLF'S ARTICLES

ONE of the practical difficulties confronting the recent graduate, and the undergraduate in the senior years who spends his summers as a junior in some hospital, is the selective use of drugs. That is to say, he knows, for example, that opiates, bromides, veronal, trional and alcohol may be used as hypnotics, but he finds it difficult to know which one to use in any individual case, and he may not know how each of these is best administered. The same difficulty is encountered frequently in the use of cathartics and expectorants. The series of articles by Dr. Rudolf, the first of which appears in this issue, should therefore be found particularly valuable, and these articles will be well worth remembering and saving for future reference, for the drugs with which they deal are in constant demand, and the precepts which Dr. Rudolf lays down will have an almost daily application in practice.

ON WRITING AN ARTICLE

PROBABLY never in the history of medical science has there been more writing than at present, and much of it is good writing. But there are hundreds of young people who, for the first time in their lives, want to write and discover that they have no gift of self expression. It is not that they are stupid. They cannot condense the atmosphere in which they live and move and have their being, into the concrete word. They should approach the job lightly and in a most casual manner. Be personal, not abstract. The weight of responsibility rests too heavily and it paralyses. Paralysis oftenest occurs early. A subject for the article is hard to choose. Not that subjects are few; they are too many. And so they are like Buridon's ass that starved between two bundles of hay because he could not decide which way to turn first. How asinine, we say, as we proceed to do the same thing. It does not matter one iota to which bundle we turn first so long as we are interested in it and are able to do it justice. Make your decision quickly, then go ahead and tell to others, in a straightforward friendly fashion, the details which you have found interesting. They, too, will be interested. Then your articles will truly reflect your own personality, and so will do you justice, please your friends, and interest strangers. Try it.

A CORRECTION

We regret that an error got past the proof-readers in the preparation of the November issue, which, in justice to the author, we feel should be corrected. On page 11, line 17, it was stated that a pint of 20 per cent. cream yields over 100 calories of energy. As is evident to one reading the article, this should read 1,000 calories.

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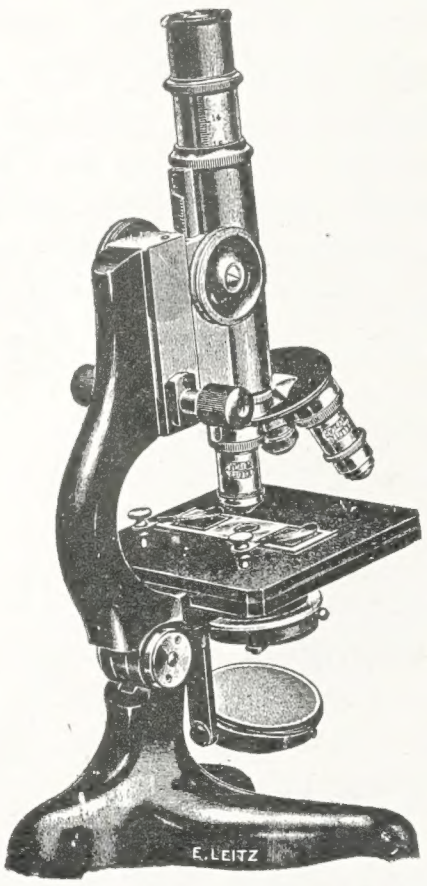

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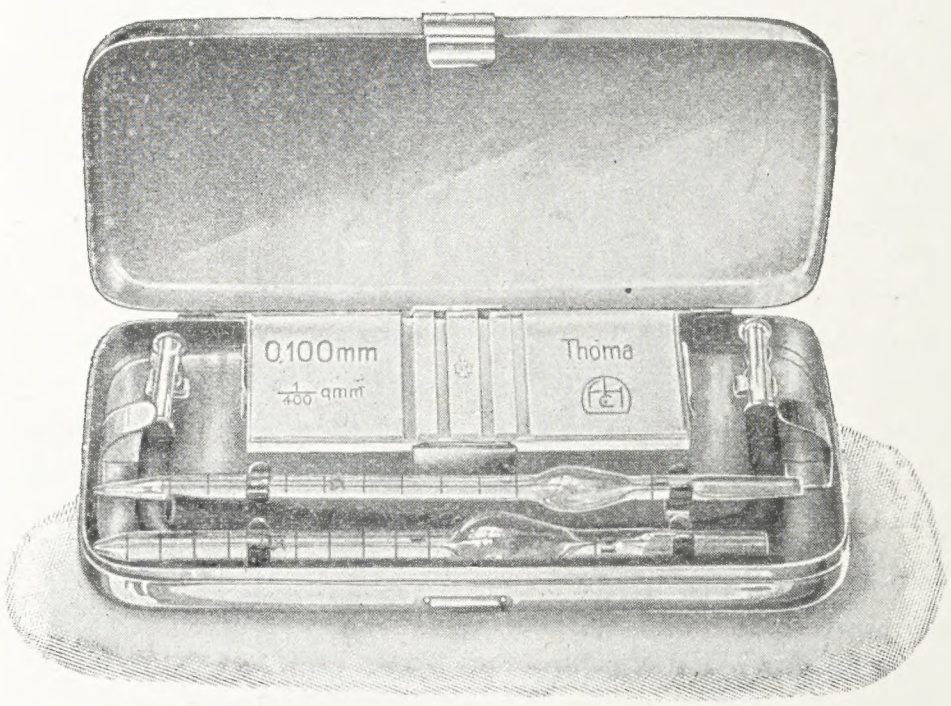

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INTESTINAL TUBERCULOSIS

A. E. Broome, M.D., C.M.
Calydor Sanatorium, Gravenhurst, Ont.

The intestinal phase of tuberculosis may be one of the most alarming of tuberculous manifestations. The term "Tuberculous bowel" is on a par with "consumption" as a word which presupposes non-recovery of a patient. Our texts, however, describe healed tuberculous lesions where narrowing of the bowel lumen and at times partial obstruction follows contraction of fibrous tissue replacing previous tuberculous deposit. That many of these cases recover without knowledge of their disease is probable. The object of this short communication is to outline diagnostic procedure employed at the present time, to recognize and localize tuberculous disease in the intestinal tract, to outline present-day treatment and management of cases, and to present a few cases which have been favourably influenced by treatment.

Diagnosis

As in all pathological conditions best results are obtained in the treatment of early cases, all means should be used to investigate the early, less startling symptoms. Cases of tuberculous disease elsewhere than in the bowel should also have full investigation of the gastro-intestinal tract. That patients may have extensive ulceration of the bowel and be symptom-free is shown by the work of Brown and Sampson.[1] Several patients of their series who came to laparotomy and resection of a segment of diseased bowel were symptom-free. The diagnosis had been made by X-ray observation of an opaque meal.

Among the more common early symptoms of intestinal tuberculosis are loss of appetite, nausea, constipation, nervousness, indigestion and slight discomfort in the lower abdomen, usually increased after eating and relieved by a bowel motion. There is frequently slight deep tenderness in the lower abdomen or right inferior quadrant.

The onset of normal habits in a patient previously constipated is suggestive. A slight bowel looseness alternating with constipation is frequently noted. A portion of tender spastic caecum may sometimes be felt through the abdominal wall.

Of the subjective signs probably the most often noted are loss of appetite and nausea. The tuberculous patient usually enjoys his meals and even with two or more degrees of fever eats well. Such is not true of patients with intestinal involvement. They find that certain foods disagree with them, lose their desire for others, and complain of indigestion and flatulence. The patient feels that if his constipation could be corrected he would be quite well again. He will probably also have noted an increasingly offensive odour from the stool. Nausea and nervousness are prominent symptoms among patients with definitely

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[1]Brown, Sampson: Journal of American Medical Association, July 12, 1919, vol. 73, pp. 77-85.

diagnosed tuberculous enteritis. These subjective signs have been accented by Stewart.[2]

Laboratory aids are of little assistance in making a diagnosis. Tubercle bacilli are, by Pottenger,[3] reported present in the faeces of seventy-three per cent. of a series of one hundred and sixty-eight sanatorium patients. When bacilli are demonstrated in stools of patients with persistently negative sputum, smegma and other acid-fast bacilli are to be ruled out of the picture (Pappenheim's stain). Blood is rarely demonstrable in the stool of a tuberculous enteritis patient and when found is of questionable diagnostic value.

A patient under treatment for pulmonary tuberculosis, who has previously been doing well but fails for a time to make headway, will bear re-investigation of his intestinal tract. This is doubly true if recent temperature elevation is noted.

The most conclusive diagnostic technique and that by which the intestine of all tuberculous patients should be investigated is the X-ray examination of an opaque meal. The method was first described by Stierlin[4] and Archibald and Pirie.[5] The following technique has given excellent results.

On the evening previous to the examination any laxative or lubricant is withheld. In the morning the patient is given a mixture of barium sulphate, six ounces, in thin cream of wheat porridge or gruel flavoured with cocoa and made up to about twenty ounces with water. A preliminary study of the stomach is done fluoroscopically during ingestion of the meal. The size, shape and motility of the organ are noted, also its emptying power, and the state of the duodenal cap. An effort is made to rule out other possible causes for indigestion. The patient is not allowed to have food till the barium has completely left the stomach. A second fluoroscopic examination is done in three hours. The head of the meal has by that time usually advanced into the large bowel with the greater mass scattered throughout the small intestine or in the loops of terminal ileum. If the stomach is empty the patient is allowed to have lunch. Hourly observations are then made for the next four to six hours, the progress of the meal being studied fluoroscopically, unfilled segments being subjected to manipulation and plates made for permanent record or futher study.

The usual observations taken for a routine gastro-intestinal investigation are insufficient. Very frequent examinations are essential between the fourth and eighth hour, or permanency of filling defects will not be recognized. The more common findings in known cases and therefore the points searched for in building up a diagnosis are the following:

(*a*) Filling defects.
(*b*) Impaired peristalsis proximal to the lesion.
(*c*) Poor or absent haustral markings.
(*d*) Hypermotility.

(*a*) *Filling Defects.*—In the absence of malignancy, persistent and persistently localized filling defects or marked irregularity of filling of

[2]Stewart, D. A.: Address delivered to Toronto Academy of Medicine, February 3, 1923.
[3]Pottenger, F. M.: Clinical Tuberculosis. C. V. Mosby É Company, vol. 1, p. 579.
[4]Stierlin: Munchen Med. Wchnschr. 58, 1231, 1911.
[5]Archibald and Pirie: Tr. Nat. Assocn. for Study and Prevention of Tuberculosis, 13 117, 1917.

the bowel in one of the usual sites of tuberculous ulceration may be considered almost as pathognomonic. The area most closely investigated, and the site of ulceration in 85 per cent. of cases (Schwatt[6]), is the terminal foot of the ileum, caecum, ascending colon and proximal half of the transverse colon. Where normal bowel shadow is replaced by an empty, incompletely filled or raggedly outlined portion of intestine, manipulation is done in an effort to obtain a more normal appearance. A portion of bowel which does not fill during several observations is looked upon with grave suspicion. The filling of the appendix is also noted at this time.

(*b*) *Impaired Peristalsis proximal to the Lesion.*—Where the bowel objects less vigorously to the passage of the meal along its course, delay is often noted proximal to the suspected area. The meal appears loath to enter the ulcerated bowel. This is most frequently noted in the lower coils of ileum where barium may be retained up to twenty-four hours or longer after ingestion.

(*c*) *Poor or Absent Haustral Markings.*—Haustrations are usually absent in definitely involved areas. The bowel does not take on the tube-like appearance seen in a non-ulcerative colitis, but the usual regular indentations are replaced rather by an irregular, ragged appearance in which the wall of the bowel is demonstrated with difficulty, if at all.

(*d*) *Hypermotility.*—This is most constant in advanced cases. A fluid evacuation takes place three to twelve hours after ingestion. A very rapid progress of the meal will have been observed at the hourly observations. A rapid piling up of dilute barium will have been seen in the descending colon and sigmoid.

Barium enemata are also used to outline the greater bowel in diagnosis. The bowel is first cleansed with a soap and water enema. Under low pressure a demulcent barium solution is allowed to flow into the bowel, the filling being observed fluoroscopically. Areas of filling defects as shown by the meal will in this way usually be seen as poorly filled or completely filled bowel. The enema is now allowed to siphon back slowly, fluoroscopic observation being continuous. Former defects will again show when the pressure is removed. The method is useful as a means of verifying findings classed as suggestive by the meal method.

Treatment

Intensive treatment is indicated and in many cases is productive of good results. The general management of the case consists chiefly in demanding prolonged bed rest for the patient and appropriate treatment for foci elsewhere in the body. Toxaemia and tissue destruction are thereby lessened, strength is conserved and reserve is re-established. Peristaltic action is diminished by less frequent use of the abdominal muscles. The body needs for repair and reserve accumulation are lessened, allowing less active absorption by the diseased bowel. The most frequent accompanying lesions are those of the lungs. Local treatment here consists of measures devised to secure local rest to the diseased area. Weights, chest splinting and artificial pneumothorax are commonly used. Thoracoplastic operations are not done on known

[6]Schwatt, H.: American Review of Tuberculosis, 1923, 1, 24.

cases of tuberculous enteritis, owing to the comparatively less hopeful ultimate prognosis.

Sun baths and artificial heliotherapy, using the mercury-vapour quartz light or the carbon arc, play a large part in treatment. Short exposures are begun to the feet and arms, gradually increasing in time and extent of body exposed. The head is kept shaded during all exposures. The skin acquires a tolerance to the actinic ray and becomes tanned. Exposures are graded so that skin burn does not occur. Greatest care is necessary in t ose with blond co plexions or sensitive skins. In the event of burn the exposures are discontinued for some days. During this time local tolerance diminishes and treatment must be begun again with shorter exposures. Over-long exposures at times induce a reactionary fatigue. Sun therapy must be used with caution in patients with advanced pulmonary lesions, as occasional acute febrile reactions or blood spitting may result. During treatment the patient acquires a new feeling of well being. Stimulation of the skin as an excretory organ through the air baths alone must be beneficial. The haemoglobin content of the blood increases, abdominal discomfort or pain lessens, probably through a peripheral vaso-dilation, and relief of congestion in deeper structures.

Local treatment consists primarily of careful diet selection. Foods containing seeds or cellulose, fibrous tissue, condiments or spices, are interdicted as irritants. Raw fruits stimulate peristalsis and are not allowed. Fried foods with excess of fat are deleted from the dietary as generally less digestible. A liberal, well-balanced diet allowing considerable variety may be made up of creamed soups, fish, game, eggs, grated meats from which all fibrous portions have been removed, strained creamed vegetables, milk and milk puddings. The menu is designed to give a minimum of mechanical irritation through lessened residue in the bowel. Occasionally the diet may be cut to milk and eggs only to tide the patient over an acute dietetic revulsion.

Locally, cathartics are contra-indicated. Occasionally an intractable diarrhoea may follow the use of a mild laxative. If constipation cannot be relieved by a bland mineral oil, enemata should be given. Very often an oil containing suppository is useful. Warm olive oil enemata are easily taken by the patient and are not followed by fatigue. Cleansing enemata should be followed by a series of two physiological saline bowel irrigations at half-hour intervals. These are well borne by the patient and give relief during acute abdominal symptoms; also by washing away irritating substances from the base of ulcers, are a much valued adjunct in treatment. The relief given may be noted for four days to a week. A considerable amount of the saline is absorbed, replacing body fluids which may have been lost in an acute bout of diarrhoea.

Drug treatment is symptomatic only. Distention is anticipated by the use of bismuth salicylate and bismuth betanaphthol or salol in five to ten grain capsules three times a day. Williams[7] recommends bismuth benzyl-naphthol as a most effectual intestinal antiseptic. Pain is controlled by benzyl-benzoate or codeine. The intravenous use of calcium chloride in many cases gives relief from the gnawing pain of a

[7]Williams, L.: Minor Maladies. MacMillan Co. of Canada, 1923, p. 117.

spastic bowel. Five to seven c.c. of a sterilized five per cent. solution of the drug are used. The selective action of the drug on unstriped muscle fibres allows relaxation of the spasm and favours an early bowel evacuation. The relief afforded has been noted for as long as two weeks. Spasm may also be temporarily controlled with atropine.

In certain cases where diarrhoea is a prominent symptom it will be necessary to use the usual astringent mixtures combined with opium. Bismuth, lead and tannic acid in mixtures, pills, or capsules will occasionally be necessary.

The X-ray exposure of the abdomen has been suggested as a possible therapeutic aid. The advantage of secondary radiations from metallic salts in the bowel has also been discussed. More complete filling of the involved segment should be possible by the introduction previous to treatment of calcium chloride intravenously.

Surgical intervention has given excellent results in many cases. Resection or exclusion of a portion of bowel where the greatest intensity of disease is situated, is in good hands not attended with a great amount of surgical risk. Suitable cases must be chosen. Patients submitted for operation are those in whom the intestinal involvement is not widespread, whose general condition is good, and whose disease elsewhere in the body is relatively limited and stationary or retrogressive. The immediate result of operation is a marked subsidence of symptoms. General treatment is continued after the operation. Quartz lamp therapy is considered a very useful follow-up.

Case Histories

M. E., female, aged 46, housewife.—Admitted April 28th, 1923; discharged May 9th, 1924. Complaints on admission: Hoarseness, fever and loss of weight. Family history: Mother probably died of tuberculosis aged 63. Two uncles and one aunt died of tuberculosis. Patient is mother of three healthy children, none dead, no miscarriages.

Personal History.—Patient has been well all her life. Mumps and measles during adult life, light attacks. Menopause three years ago. No other illnesses.

Present Illness.—Onset January, 1923, as a cold in the head. Developed laryngitis. Fever persisted and symptoms increased. Gradually increasing cough and expectoration during January and February, with occasional night sweats. In February fever to 103° and 104°. Gradual subsidence during March. Hoarseness persisted. Diagnosis April 9th, 1923, of advanced pulmonary tuberculosis of right lung, minimal left lung lesion, laryngeal tuberculosis.

Condition on Admission.—Temperature 102°. Pulse 90. Blood pressure 115/75. Weight 96 lbs. Haemoglobin 71 per cent. W.b.c. 9,400. Patient pale and poorly nourished. Chest revealed impairment of resonance right apex to 1st i.s. Bronchovesicular breathing same area. Moderately coarse rales on ordinary inspiration, increased by cough, to the right anterior 4th rib and above spine of scapula. Whispered bronchophony right apex. Harsh, vesicular tone heard distally in the 1st and

2nd left i.s. A few moderately coarse rales, increased after cough, in same area. Heart normal. Left pupil slightly dilated. Larynx: Ventricular bands thickened. Extensive superficial ulceration on left ventricular band. Vocal chords congested, slight thickening of inter-arytenoid space. X-ray of chest shows parenchymatous tuberculous involoment of right lung as low as the 5th rib. Cavitation one and a half inches in diameter in 1st i.s. Left lung: Thickening of bronchial tree in 1st and 2nd i.s.
Diagnosis.—Advanced pulmonary tuberculosis; laryngeal tuberculosis. Patient reported some gas distention of abdomen, no pain, appetite below normal. Barium meal was given. Stomach normal, irregularly filled caecum, gas at hepatic flexure and transverse colon, haustrations absent to middle of transverse colon. By the seventh hour meal was beyond middle of transverse colon. Caecum not filled at any observation. Entire meal in descending colon and sigmoid by the ninth hour.
Diagnosis.—Tuberculous colitis involving the caecum, ascending colon and hepatic flexure.
On 1/6/24 films showed advancing disease in right chest and a more definite lesion in left. Right side artificial pneumothorax 4/6/24; good collapse was obtained. Adhesion at 2nd anterior rib. During the summer months patient was extremely ill. Voice rest and pneumothorax therapy continued. Temperature during summer to 101° daily, with occasional rise to 102°. One elevation in September to 105°. Patient on selected intestinal diet. Temperature resolved rapidly during September and patient was given quartz lamp therapy. Weight September 15th, 1923, 90½ lbs. Sputum 30 grammes daily. During November, December and January patient's temperature showed occasional elevations to 99.2, gradual gain in weight and subsidence of symptoms. During March temperature was normal at all times. Intestinal condition negative. Weight 114. Pulse 80 to 96. Discharged May 9th, 1924. Weight 115½ lbs. Temperature 97.2 to 98.3. Pulse 68 to 84. No sputum. Larynx normal. No hoarseness. No subjective signs. Pneumothorax therapy still maintained.
Barium meal 3/4/24, caecum well filled from four to ten hours. No hypermotility. Greater bowel filled from caecum to sigmoid at twenty-four hours.

R. M. N., male, aged 26, salesman.—Admitted February 18th, 1924. Patient still under treatment. Complaints: Abdominal pain after meals, loss of weight, easy fatigue. Family history, one paternal uncle died of tuberculosis.
Personal History.—Childhood illnesses not of interest. Patient had indefinite abdominal pain after meals, intermittent, three or four days every week previous to 1915. Served in the army 1915 to 1919. Shrapnel wound over left clavicle, 1918. Slight tear gas exposure at the same time. Was in hospital one week. Discharged from army May, 1919, at maximum weight of 160 lbs. Patient was symptom-free. Worked in wholesale shoe store till April, 1923. Five teeth extracted for apical abscesses 1919 and 1921.

Present Illness.—Slight cough and sputum since 1921. Abdominal discomfort after meals since 1921. This was relieved by lying down. Patient slightly constipated. Weight 145 lbs. Condition unchanged until January, 1923, when cough and sputum increased. Patient felt below par and in April, 1923, took a holiday. Occasional night sweats. Weight 135. Some indigestion. October, 1923, acute abdominal pain, worse on right side, no vomiting. Appendix was removed. Pathologist's report "Acute Inflammation." Good recovery. Second acute abdominal attack December, 1923. Barium investigation of intestine done, disclosing advanced pulmonary tuberculosis and intestinal tuberculosis. Daily temperature at this time to 99.4. Two to three night sweats weekly. Patient has been in bed since that time. Has considerable gas distress after meals. Bowels constipated. Slight cough. Sputum drachms one daily, positive for tubercle bacilli.

Condition on Admission.—Advanced pulmonary lesion involving upper lobes and upper parts of lower lobes of both lungs. Excavation in the right apex. Temperature 97 to 100. Pulse 80 to 100. Weight 127½. Scanty cough and sputum. 4/3/24, barium meal: From sixth to eleventh hour poor filling of caecum and proximal transverse colon was noted. Spasm of transverse colon persistent during investigation. Diagnosis: Intestinal tuberculosis. 9/7/24: Patient failing to gain weight. Temperature 99 to 100.6. Slight decrease in cough and sputum. Some gas and abdominal pain. Bowels regular with Russian oil. Patient has been taking quartz lamp therapy for six months. 16/8/24: Marked abdominal distress recently. Short time relief afforded by triple enemata—calcium chloride 5 c.c. of 5% solution intravenously; quite marked relief persisting for two days only. Abdomen very sensitive and tender. Marked distention. Calcium solution repeated. Relief for few hours only. Pain controlled with difficulty with benzyl-benzoate. 20/8/24: Colectomy. Removal of fifteen inches of caecum to proximal transverse colon. Terminal six inches of ileum also removed. At operation signs of further ulceration noted along small bowel. Gas-oxygen anesthesia. Patient made excellent recovery with total relief from pain. Slight diarrhoea after operation. Two or three unformed stools daily. 17/10/24: Bowels regular. No pain since operation. Marked increase in appetite. 13/11/24: Gain of 8 lbs. in weight. Bowels regular. No pain. Decreased cough and expectoration. Patient taking quartz lamp therapy.

W. R. K., female, aged 32, bookkeeper.—Admitted 9/8/19; discharged 15/3/20. Readmitted 13/4/20; discharged 19/4/21. Complaints: Discomfort and soreness right iliac fossa on walking, cough, sputum (recently blood stained), moderate night sweats, soreness in upper chest. Family history negative.

Personal History.—Bookkeeper for fourteen years. Has been very well all her life—occasional winter colds.

Present Illness.—Acute cold May 24, 1919, acute symptoms subsiding in one week. Cough persisted, sputum positive for tubercle

bacilli in June. Haemoptysis, four ozs., July 10. Daily temperature to 101° from this time to admission.
On Admission.—Temperature range 98.8 to 100.8. Pulse 88 to 96. Weight 110 lbs. Physical examination: Moderate infiltration to 4th right anterior rib. X-ray shows in addition slight mottling left lung between 3rd and 5th ribs. 15/11/19: General condition improved. Weight 118 lbs. Signs of recent infiltration left upper lobe. Patient complaining of flatulence. 30/11/19: Barium meal shows large bowel lacks proper haustral markings. No spasm. 16/12/19: Barium meal, inconstant spasm of ascending colon with filling defect. Haustrations lacking in caecum. Spasm and filling defect from hepatic flexure to middle of transverse colon. 30/12/19: Five days of intestinal discomfort, nausea, colic. Vomited several times in three days. Recent distaste for food. Flatulence, tender abdomen. Indefinite thickening in right iliac fossa which can be rolled under finger. Bowels always regular. Cough and sputum scanty. 7/2/20, barium meal: Almost complete filling defect and lack of haustral markings from caecum to middle of transverse colon, from the fourth to eighth hour. Diagnosis: Tuberculous colitis. 14/3/20: Colectomy. Removal of caecum, ascending and six inches of transverse colon. Gas and oxygen anesthesia. Many ulcers in specimen removed. 13/4/20: Readmission from general hospital. Chest signs not increased. 28/8/20: Patient has improved. Has been taking sun cure all summer. Chest signs show increasing fibrosis. One unformed bowel motion daily. Occasional slight diarrhoea. 18/11/20: Once or twice in two weeks has slight distress across abdomen at level of umbilicus, accompanied by three or four diarrhoeal movements. Relieved by saline enemata. Slight tenderness above umbilicus. 18/4/21: Abdomen comfortable. Symptoms as just described, but less prominent: No spasm. Chest signs markedly diminishing. Temperature 97-8 to 98. Pulse 68 to 74. Weight 125. 12/5/24: Patient admitted for review. Temperature and pulse normal. Weight 140. Sputum had been positive during October, 1923, negative since that time. Slight cough in January, 1924. No sputum for past two months. No cough. Abdomen gives no trouble whatever. Patient eats and digests any food. One unformed motion daily. Chest signs markedly retrogressive. Barium meal negative for intestinal tuberculosis.

GOITRE

By C. B. Horton, '25.

(From a paper read before the Seventeen Club, Oct. 24, 1924).

By the term goitre we understand abnormal conditions of the thyroid chiefly involving its function. Inflammatory changes do not come under this category but we shall refer to them.

A classification of abnormal thyroid conditions, which, though not faultless, will fit our purpose well, is that proposed by Phillips, a Toronto graduate now in Cleveland. His classification is as follows.

1. Simple goitre.
2. Colloid goitre.
3. Thyroid adenoma.
4. Exophthalmic goitre.
5. Hypothyroidism and athyroidism.
6. Malignant tumors of the thyroid.
7. Inflammations of the thyroid (Thyroiditis).

Simple goitre is the goitre of adolescence and pregnancy, usually found in women. It is etiologically due to a deficient iodine intake, usually occurring at a time of increased demand for this element. Due to the iodine deficiency, the gland undergoes hypertrophic changes. There is increased vascularity, softening of the gland, increase in size of the epithelial cells with an enlargement of the follicles, and a diminution in iodine and colloid content. There may be a small amount of hyperplasia if the hypertrophy is allowed to continue unchecked, and even exophthalmic goitre may be the result later on.

Colloid goitre comprises the rather large body of thyroids which cause a bulging neck that is fairly symmetrical bilaterally. The condition is not a pathological unity but includes an involution type and an adenomatous type. When a hypertrophied and hyperplastic gland recovers, it involutes and becomes smaller, firmer, and less vascular than before, and it increases in colloid and iodine content. Its follicles are still larger than normal and it is still a goitre, but from a physiological viewpoint it may be quite normal and contain a normal amount of iodine.

There is a type of colloid goitre which consists of multiple, closely packed nodules of well differentiated tissue, with thick capsules. These nodules are adenomata and the goitre is called diffuse colloid adenomatous goitre.

Adenomata occurring singly in the thyroid gland are considered by Crile to be derived from Wölfler's "rests," which are small areas of embryonic thyroid tissue laid down in the intra-uterine period due to an iodine deficiency occurring at that time. The rest may start growing at any time of life, and may then become a very definite tumor composed of a circumscribed, encapsulated, unlobulated mass of follicles. These adenomata may be without symptoms, or non-toxic, or may be the cause of a clinical syndrome called toxic adenoma. Adenoma may be found in a state which is probably pre-cancerous, and which is termed by Crile malignant adenoma.

Exophthalmic goitre is the name usually given to a clinical syndrome which we shall consider later. The known pathology of this condition is a very definite hyperplasia of the thyroid. Crile uses the term hyperthyroidism as an equivalent for exophthalmic goitre, but the writer is unable to agree. This condition usually follows a simple goitre and is probably an iodine deficiency disease.

Hypothyroidism and athyroidism, if the latter exists, are diseases of a deficiency or absence of thyroid tissue. The etiology varies in the different types. If a thyroid gland, which is unable to obtain a sufficient amount of iodine and is consequently undergoing hypertrophy and hyper-

plasia, remains for a long time in a state of dire necessity, it will become exhausted and will atrophy. A complete atrophy is rare, and, we believe, lethal.

The operative removal, or inflammatory destruction, of the entire, or almost entire, thyroid gland causes a clinical condition known as cachexia strumipriva, or myxedema. The condition is one of insufficient thyroid secretion. Cretinism is really a congenital myxedema of unknown etiology. Its pathology is much like that of myxedema.

Ninety-five per cent. of thyroid malignancies are carcinoma. Carcinoma of the thyroid is little different from carcinoma elsewhere. Its pathology is of the same type, and its etiology no clearer. Sarcoma comprises the remaining five per cent. The types usually found are round-celled or spindle-celled, but giant-celled sarcoma and lymphosarcoma may be found. Sarcoma may coexist with carcinoma.

Inflammation of the thyroid, or thyroiditis, may be:

1. Acute pyogenic abscess.
2. Diffuse acute inflammation.
3. Syphilis.
4. Tuberculosis, miliary or caseous.
5. "Ligneous thyroiditis."

These conditions do not come into the province of the metabolic worker and will not be considered further. Their treatment is by the usual medical or surgical methods.

Before considering the diagnosis and treatment of a group of metabolic diseases, we must get into alignment the physiological principles involved. The subject of iodine and colloid content of the thyroid has been mentioned, but its significance has not been explained. Conceptions of thyroid function have in the past been many and various, but to-day, owing to the work of Marine, Kendall, Crile, Lenhart, Smith, Brodie, and many others, we are able to put down the salient facts of our present belief in a more or less coherent form.

The thyroid gland is mainly concerned in iodine metabolism. The iodine intake of the body is absorbed by the thyroid and used in the manufacture of thyroxin, a complex hormone which stimulates oxidation. The thyroxin is stored in the colloid substance of the thyroid until it is required. Then it is secreted directly into the bloodstream, by which it is distributed throughout the body to act on the entire body mechanism. Its main action is to stimulate metabolism, and the rate of the latter appears to be governed by the rate of liberation of thyroxin into the circulation. The role of iodine is not yet entirely understood, but it is interesting to note the statement by Marine, that a thyroid containing more than 0.1% of iodine cannot be abnormal anatomically. It has been shown that while the normal iodine content is 0.25%, the iodine content of hyperplastic thyroids is only 0.05%. Iodine content bears an inverse relation to the amount of epithelial hyperplasia, and a direct relation to the colloid content.

Bearing this physiology in mind, let us approach the subject of goitre from its clinical aspect. We shall start with a consideration of simple adolescent goitre, which, we said, was due to iodine deficiency. In 1917

Marine and Kimball conducted a classical experiment on simple goitre prevention among the school children of Akron, Ohio. A course of iodine that was intended to be prophylactic was given to all children who had their parents' consent to undergo the experiment. The course was 0.2 gm. sodium iodide daily for ten days. The course was given every six months, and observations were carried on for varying periods up to thirty months. The results of this experiment are shown in the table below.

Results of 2,190 pupils taking, and 2,305 pupils not taking the prophylactic iodine treatment.

Thyroid	Taking (per cent.)	Not taking (per cent.)
Originally Normal		
Size unchanged	99.8	72.4
Size increased	0.2 N.B.	27.6
Originally Slightly Enlarged		
Size unchanged	41.9	72.8
Size increased	0.3	13.3
Size decreased	57.8	13.9
Originally Moderately Enlarged		
Size unchanged	20.3	64.0
Size increased	0.0	23.6
Size decreased	79.7	12.4

N.B.—This 0.2% consisted of two girls, one of whom was a congenital luetic, and the other a case of general lymphoid hyperplasia.

These results speak for themselves. They show conclusively that iodine will always, medically speaking, prevent an increase in the size of simple goitre and will actually cause a decrease in one-half to four-fifths of the cases already existing. It must be borne in mind that this was an experiment on prophylaxis, and that these results cannot be expected in long-standing cases of goitre in adults. Present feeling is that the dose of iodine should be smaller and its use continued over a longer period than was the case in this original experiment. Any preparation of iodine or iodide, not otherwise contraindicated, is suitable for goitre prevention. At present iodized table salt appears to be the most practical.

Marine and Crile believe that this iodine treatment will not only prevent the simple goitres of adolescence and pregnancy, but in the latter case will also prevent the formation of Wölfler's rests in the fetal thyroid and hence also the subsequent appearance of adenoma of the thyroid, and even a large part of thyroid malignancy. This is still theoretical, but it is comforting.

Colloid goitre is diagnosed on the finding of a definite, diffuse, rather symmetrical enlargement of the thyroid in a person who shows no constitutional or toxic symptoms, and who says that the enlargement has been there for some years. A very large goitre of this type is easily diagnosed, but the smaller ones may prove confusing. Treatment of colloid goitre is very different from that of simple goitre. Here, iodine is incapable of changing the size of the gland. Symptoms, when present, are due to pressure on adjacent structures, such as trachea, oesophagus.

cervical vessels, and laryngeal nerves. Colloid goitre may be found within the chest, and the symptoms are again due to pressure. X-ray may reveal distortion or displacement of trachea, etc. Treatment may be indicated by these symptoms, or may be demanded on esthetic grounds. It is surgical and consists of partial thyroidectomy.

Non-toxic thyroid adenoma resembles colloid goitre, from the clinical standpoint. It is asymmetrical and nodular, but is otherwise about the same. The adenoma may have degenerated into a cyst, or may have become calcified. Treatment is indicated by pressure signs or by esthetic considerations, and consists of excision. The so-called malignant or precancerous adenoma of Crile is not a clinical entity, and is diagnosed microscopically on adenomas removed for some other reason.

Toxic adenoma is the cause of a clinical syndrome which goes by the same name. There is much confusion about the terms toxic adenoma, exophthalmic goitre, and hyperthyroidism. Strictly speaking, hyperthyroidism should mean merely an overactivity of thyroid tissue. Any symptoms not referable to an excess of thyroxin cannot be considered as part of a condition of hyperthyroidism. Treatment of the condition will aim to reduce the activity of the thyroid tissue as a whole, or to remove an amount of tissue sufficient to compensate for the increased activity. Wilson of the Mayo clinic describes a slowly developing type of toxic thyroid which has an increased metabolic rate with no exophthalmos usually associated with a nodular gland. He considers this a true type of hyperthyroidism due to "the absorption of complete thyroxin secreted in previously stored colloid." Plummer calls this the hyperfunctioning adenoma. It is our toxic adenoma. With our physiology in mind we can see that iodine will exacerbate this condition. Treatment here is for hyperactivity of the gland, especially the nodule causing the trouble. Surgical excision of the nodule, or the bloodless surgery of the X-ray is the treatment required.

We mentioned that Crile terms exophthalmic goitre hyperthyroidism. But we do not believe that exophthalmos can be caused by a simple excess of thyroxin. Furthermore, the districts in which exophthalmic goitre is commonest are the districts where we find the greatest prevalence of simple goitre which we know is a deficiency disease. Also exophthalmic goitre is usually an aftermath of simple goitre. Probably the correct view is stated by Wilson, who says that true exophthalmic symptoms are caused by absorption of an incompletely elaborated thyroid secretion. We believe that the incompleteness is a lack of iodine.

Wilson and Clarkson of Toronto stress the suddenness of the onset of Graves' disease. Clarkson believes that there is a nervous element in the precipitating cause. Pearson, of Vaucouver, and Clarkson emphasize that the disease is a self-limiting one with acute exacerbations. They, however, point out that it is very severe and that recoveries cannot be expected without skilled assistance or interference. There are four cardinal signs and symptoms of Graves' disease. They are: (1) Goitre, (2) Exophthalmos, (3) Tremor, (4) Tachycardia of 90—180. We also find lymphocytosis, vasomotor signs, respiratory signs, voice signs, digestive signs, G-U signs, metabolic signs, nervous symptoms, and muscular

signs. The criterion of increased metabolism is the actual measurement of the basal rate, but this frequently cannot be done, and is often inaccurate. The Goetsch test for hyperthyroidism has not been approved locally.

The differential diagnosis of Graves' disease must exclude: toxic goitre, done on the history of onset, lack of exophthalmos, and palpation of the thyroid; neurasthenia, on metabolic rate and long history of neurasthenia; irritable heart, seen in life-long delicate people; pulmonary tuberculosis; paroxysmal tachycardia; thyroiditis. The diagnosis is difficult only in borderline cases. Strathy, of Toronto, offers a very practical test. He puts the suspected case to bed and orders absolute rest. If the pulse falls to approximately 72 in a very few days, the case is *not* exophthalmic goitre.

The medical treatment of Graves' disease, as outlined by Strathy, is absolute rest in bed with sedatives, continued as long as improvement is noted. Then give Lugol's composite solution of iodine, min. x, h.s., for as long as any further benefit is noted. If the case continues its downward course, more radical treatment is demanded. Radium, X-ray, or subtotal thyroidectomy are the treatments available. They all have their difficulties and give different results in the hands of different operators. Choice is governed by circumstances usually beyond the physician's control.

Hypothyroidism is found clinically as myxedema and cretinism. As explained before, these are really the same disease at different periods of life. There is a low metabolic rate, poor cerebration, and the typical solid edema. Hypopituitarism must be excluded. Cretinism has the same signs as myxedema, but more marked. Growth is very stunted. It must be distinguished from Mongolianism and achondroplasia, but this will usually be easy.

Hypothyroidism is treated by the administration of thyroxin or dessicated thyroid. (It is the only definite indication for this therapy). According to Plummer and Boothby, the treatment of hypothyroidism is to raise the amount of available thyroxin in the tissues up to normal by one, or two, or three large doses, and then to maintain this level by daily appropriate doses, started when metabolism is normal. The first large dose is followed by a latent period of twelve hours or so. Then marked symptoms of headache, loss of appetite, nausea, joint-pains, and raised metabolism appear. These are worst about the second day. When these symptoms disappear, the regular doses may be cautiously begun. Cretins require relatively larger doses than would be estimated on the comparative basis of weight. The average cretin under five years of age seems to do best on a dose of about ½ to 1 grain of dessicated thyroid daily.

Malignancy of the thyroid should be suspected if a goitre begins to enlarge rapidly, especially if it is painful or adherent to the skin. We find emaciation, cachexia, and remittent fever. Death is due to exhaustion or pneumonia. Treatment of carcinoma or sarcoma of the thyroid is extirpation. Surgical removal is the method of choice, but X-ray may be used on inoperable cases.

THE USE OF HYPNOTICS

By Robert Dawson Rudolf, F.R.C.P.
Professor of Therapeutics, University of Toronto

The employment of medicinal agents as hypnotics (somnifacients) is a question of great importance, and only the merest outline of the subject can be here attempted. Generally speaking, sleep-producing drugs should be used with a very sparing hand and only after all other means have been tried in vain. But, while it is bad practice to give them too freely, when they may do more harm than good, it is equally bad practice to withhold these remedies when they are really necessary.

Sleep is essential to life, more essential, indeed, than is food, for an animal can go longer without nourishment than without sleep. We do not know exactly what the essential nature of sleep is, but we do know that it consists of an unconsciousness that at rhythmic intervals steals over the brain, and that during it many biochemical changes take place so that the subject eventually wakes with powers renewed for the carrying on of the functions of life.

As a rule the blood pressure is low during sleep, but there is much evidence that this hypopeiesis is an accompaniment and not the cause of sleep, and it has been recently shown by McWilliams that often the blood pressure is high during the repose, so much so, indeed, that cerebral haemorrhage or angina pectoris may then occur in the predisposed individual. A man who has a diseased circulatory apparatus which constrains him to go very easily during his waking hours may in a dream be subjected to such a rise in pressure that something gives way, and thus no doubt can be explained many deaths that occur during sleep.

The amount of sleep required by different persons varies greatly, and what may be sufficient for one may be quite insufficient for another. The middle-aged need on the average some seven or eight hours; infants spend most of their time unconscious, and the aged seem to require less and less as the years go by.

Whatever be the essential nature of sleep it is evident that it depends upon two factors, (1) the degree of irritability of the central nervous system, and (2) the amount of afferent stimuli reaching that system.

The irritability of the brain cells may be increased by toxins of various sorts, either produced in the body or introduced from without; by circulatory disturbances; by fatigue and neurasthenia, etc. Such an irritability is often an inherited weakness and insomnia tends to run in families. In the presence of this hypersensitive central nervous system the normal afferent impulses that constantly reach it from all over the body may be sufficient to prevent sleep. But even if the first factor does not predominate and the brain cells are not unduly excitable sufficient afferent stimuli may arrive to inhibit repose. This is seen when a man is kept awake by an aching tooth, by worrying thoughts, by bright light, loud noise, or any bodily discomfort. When both factors are at work and there is both a hypersensitive central nervous system and some increase in afferent stimuli then sleep becomes doubly impossible.

When a sleepless individual comes to his doctor for relief the latter does not treat the insomnia but rather the sleepless patient, and there are few conditions in which this distinction is more important. In every case one must try to estimate the degree of insomnia and this is often difficult. A neurotic person will come with the story that he has not slept for a week and yet his very appearance shows that this is not the case. It has been well said that people sometimes dream that they have not slept! Again, as already said, the number of hours of sleep required vary and this must be taken into account in judging of the severity of the individual case. The other day an old lady told me that she was very sleepless and wakened at four o'clock every morning, but it turned out that she regularly went to sleep at eight so was not doing so badly, and certainly required no hypnotic.

In every case the afferent impulses should be reduced as much as possible and hence the sufferer should avoid light, noise, heat and cold. Cold feet are often a source of the trouble, and bed socks, or hot or even cold foot baths, may often be sufficient to bring about the desired result. Heavy meals in the late evening should be cut out and also tea and coffee and excessive smoking. If pain be the cause there is nothing like an opiate, but here one must beware. If the pain be likely to be of short duration it may be so treated, but in chronic cases such a therapy is apt to lead to habit formation and hence should be avoided. There is one exception to this rule and it is when the pain is due to some irremovable and fatal cause such as cancer, and then the days which are already numbered should he made more bearable by the sufficient use of opiates. The danger of habit formation does not here exist.

A common form of insomnia occurs in elderly people with gastric acidity. Here both factors are at work in that afferent impulses from the disturbed stomach tend to keep the person awake and also there may be a degree of toxaemia which increases the irritability of the nerve centres. A hot alkaline drink at bedtime often acts here better than anything else.

Occasionally a person is "too tired to sleep" and in such a light meal may be given, or a stimulant, such as tea or coffee, which with most would tend to keep them awake. Such people invariably have low blood pressures. When the centres are disturbed by heart failure digitalis should be used and as this organ improves the sleeplessness will lessen. In many instances the circulatory unrest is of functional origin and hydropathy is here invaluable. Tepid baths may be used or the patient be wrapped in a wet sheet for about half an hour and then quickly rubbed dry. Such treatment is very soothing and probably acts by equalizing the circulation.

Where all possible disturbing afferent impulses have been controlled and all possible causes of increased irritability of the centres have been treated and yet sleep is wooed in vain drugs may be required. Dr. S. J. Gee used to say that "the great danger of sleeplessness was the drugs taken to relieve it," and while there is much truth in this dictum it is a little too sweeping. As already said, hypnotics should be avoided as much as possible, especially in chronic cases, but where sleep does not come we must remember its vital importance, and hypnotics may be the lesser of two evils. It is only necessary to see the improvement that

comes over a bad case of pneumonia, who has been sleepless and who at last has had some hours of repose from the use of some drug, to realize that the withholding of the remedy would be a therapeutic sin. Life may be saved by a timely hypnotic.

When a somnifacient is necessary the mildest should first be tried and those that are the least likely to produce a desire for their continuance. The number of hypnotics known are legion and only a few of the best can here be mentioned, beginning with the mildest.

In some slight cases Aspirin (*Acetylsalicylic Acid*) has a distinctly sedative effect and may be given in a ten grain dose at bedtime. It is specially useful where some slight pain or discomfort exists.

Bromides are much used and can be given either in a single dose of 30 to 40 grains at bedtime or thrice daily in proportionate amounts.

Chloralamide (*Chloral Formamidum*), in the dose of 20 to 30 grains in solution flavoured with liquorice, is often useful.

Veronal (*Barbitonum*), 5 to 10 grains, is much used and is generally effectual. The soluble Veronal-sodium is in my experience not so good.

The Sulphones, *Sulphonal* and *Trional,* in doses of 15 to 25 grains, are active hypnotics. They are slowly absorbed and hence should be given early in the evening. It is found that they, and also veronal, often act well also on the second night and thus they may be given only every other day.

In very excited patients Paraldehyde and Hyoscine are of special value. The former has a very unpleasant taste but if the patient is semi-delirious this will not be noticed and in other cases it may be given in capsules or in a mixture disguised with glycerine, rectified spirit and cinnamon. The ordinary dose is one drachm. Hyoscine is best given hypodermically and an injection of 1/150 grain of the hydrobromide will often cause sleep in the wildest patient.

Chloral Hydrate is the most powerful hypnotic that we possess next to opium. It is quickly absorbed and quickly excreted and hence is best given in small doses which can if necessary be repeated during the night. The official syrup contains ten grains to the drachm and this is a safe dose. None of the somnifacients so far mentioned are of much value when the insomnia is due to pain or great bodily discomfort. When these exist there is nothing that equals *opium* or one of its alkaloids, but they must be given with caution and never allowed to people for self-administration. Most cases of morphomania can be traced to bad companionship and hence can be termed vicious but one occasionally occurs as a result of professional administration. I once knew a profound laudanum addict who said that she had used her drug for forty years since a doctor had prescribed it for the after-pains of childbirth. The Dominion Drug Act is now so wisely and strictly administered that such a cause of addiction has become very unlikely, but still the physician should remember that when he uses narcotic drugs, which sometimes he must do if he would perform his duty properly, he is using edged tools.

Often a combination of hypnotics acts better than large doses of a single one. Thus five grains each of veronal and aspirin produces sleep as well as a much larger dose of the former and hence is preferable. Bromidia, which is very similar to the non-official *Liquor Bromo-Chloral*

Compositus, is very useful in drachm doses. A drachm contains ten grains each of chloral hydrate and potassium bromide, with a small amount of cannabis indica and hyoscyamus.

When it is necessary to use hypnotics for some time (and such is not often the case) it is wise to vary them occasionally as patients become relatively immune to any one, and also the production of the habit is less likely to occur.

These scattered notes may be epitomized as follows:

1. Hypnotic drugs should only be used when nothing else will serve.
2. The mildest should always be first tried.
3. A combination of two or more is often better than a single one.
4. They should be varied from time to time.
5. Opiates should never be used in ordinary insomnia, but when great pain or discomfort exist and the cause is a passing one they are the most efficient of somnifacients.

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THE ROLE OF FOCAL INFECTIONS IN MENTAL DISORDERS

Lillian Sher, '25.

Probably no subject has caused so much discussion and comment for the past few years as psychiatry, especially since the advent of Freudianism. It is equally true that probably no efforts have been so unproductive of any real results as the work in this branch of Medicine.

The factors usually given as being of prime importance in mental disorders are heredity and psychogenic factors. We would not attempt to eliminate the influence of heredity or its consequent inherited predisposition. At the same time, in the opinion of most psychiatrists, it should not occupy the prominent position that it has in the past. We can all agree that it is a factor which cannot be influenced by discussion or treatment; that it is a fixed quantity in the equation, and other factors which can be successfully attacked offer a much more fertile field for investigation.

No one connected with hospitals for the insane would delude himself with the idea that mental treatment of any character has been successful when applied to the so-called functional group. The recovery rate for institutions throughout the country would not exceed 25% of those admitted. Hence the intensive work done in the last few years in the psychogenic field has not produced the results anticipated by its adherents.

If the traditional belief in the important roles of heredity and psychogenic factors is destroyed, what is there to offer as the causative factor?

Recently the attention of a group of medical men has been focussed on the physical condition of insane patients. This idea has apparently suggested itself before, as in 1875, Savage, the English alienist, reported the recovery of cases of mental disorder following the extraction of infected teeth. The significance of this was not realized at the time.

We all know that many persons harbour chronic sepsis without showing any distinct physical or mental symptoms. This condition of apparent health in the presence of sepsis depends largely upon the patient's immunity, for as long as the immunity or resistance is sufficient to control the infection, no serious results will occur. However, let any factor, either physical or mental, become operative in the mechanism whereby immunity is lowered, the infection immediately becomes more active and virulent

In 1905 Dr. Henry Cotton, now Medical Director of the New Jersey State Hospital at Trenton, undertook an investigation of the cortex in the so-called functional disorders, working under Alzheimer at the Royal Psychiatric Clinic at Munich. The result of this work was the discovery of certain distinct changes in the nerve-cells in this group of disorders. Sir Frederick Mott also contributed valuable data to the lesions of the cortex in these conditions.

Dr. Cotton, working on this basis,—that an abnormal mind could not exist with perfectly normal brain tissue,—began his investigations from an organic, rather than a functional, viewpoint. Aided by numerous co-workers, he has been able to show conclusively, in the past five years, that the psychotic patient harbours multiple foci of infection which often can be located and eliminated only with the greatest difficulty and persistence on the part of the physician. In order properly to locate and eliminate these multiple septic foci, the psychiatrist has had to call to his assistance the well-qualified specialist in other branches of Medicine, so that to-day the modern hospital for mental and nervous disorders is only adequate in so far as it is equipped to carry out the principles embodied in the term "diagnostic survey" of the individual.

The New Jersey State Hospital at Trenton is aiming at this ideal of mental treatment, and the successful treatment of 1412 cases during the last five years must be accepted as evidence that their work has been efficient. The fact that the recoveries in the last five years average 87% of this group, against an average of 38% for a period of 10 years prior to 1918 should be convincing. The latter can be considered as spontaneous recoveries, and the increase of 49% is due entirely to the methods of detoxication employed.

Conclusion

The so-called functional psychoses we believe to-day to be due to a combination of many factors; but the most constant one, and, from the standpoint of treatment, the most important one, is the intra-cerebral, biochemical cellular disturbance arising from circulating toxins originating from chronic foci of infection, these foci being situated anywhere throughout the body. The psychogenic factors should not be ignored, as they have an important role in precipitating the mental disturbance in an individual literally saturated with infection, and the resulting toxaemia.

LEEUWENHOEK—PIONEER MICROSCOPIST

By Muriel E. Hall, '28, and Rachel K. Haight, '28.

The 16th and 17th centuries will be remembered primarily as the age in which occurred the greatest revolution in scientific thought and procedure which history has yet witnessed. The intellectual minds of Europe were failing to find satisfaction in merely reading and accepting the observations of the great men of the past. Vesalius, the anatomist, was the first to break away from tradition in this regard—to rely upon his own observations and make deductions from these.

A great impetus was given to the practice of observation by the discovery of the microscope, which was first introduced in the early part of the 17th century. Developed first in connection with physics, it was destined to play a tremendous part in the advancement of the science of biology. The microscope proved to be the key to unlock the doors of the natural sciences. This wonderful instrument had been sufficiently perfected by the middle of the 17th century to make possible scientific advancement that was epoch-making in character.

Between 1628 and 1723 we find three names intimately connected with microscopic study and discovery—Malpighi of Italy, Swammerdam and Leeuwenhoek of Holland. To them is largely due the great advancement in anatomy and the allied sciences during this period.

Antony von Leeuwenhoek was a man of extraordinary ability and keen observation. He was unique in that his work was the product of a mind which had undergone no training from the usual sources. He was self-taught. He had never had the advantage of a university education, nor had he ever had a master in a scientific subject. As a result, his work, for the most part, lacked the cohesion and sequence which characterized that of Malpighi and Swammerdam, both of whom were graduates of well-known universities. He was born in Delft, Holland, in 1632, four years after Malpighi and five years before Swammerdam. He was a mixed racial type of Semitic-Teutonic stock. He came of a family of Delft brewers, of good standing, and undoubtedly wealthy. His schooling, however, was brought to a close at the age of sixteen when he went to Amsterdam in the capacity of cashier and bookkeeper to a clothing firm. He remained there only a few years, returning to Delft, where he devoted himself to scientific observations. He was twice married, but had only one child, a daughter. In Delft he held a minor office under the court, that of a beadle, for which he received £26 a year. Owing to the easy, if not affluent circumstances of his family, he was never obliged to resort to any pecuniary measures to enable him to continue his work, and thus, though his life was a busy one, it was devoid of many of the anxieties and handicaps which so frequently have followed men of genius. In addition to this, he had the means of access to the most influential circles of his time, which enabled him to find recognition for the results of his labours. His chief interest was in the new inven-

tion, the microscope, and though he was not the skilled dissector that was Swammerdam or Malpighi, he made very valuable observations on the structure of the animalcula, on plants and even on minerals.

The microscopes used by Leeuwenhoek were simple in construction, each consisting of a lens, of small size but considerable curvature, set between two plates of metal, and fitted with an object holder and two screws by which the focus was adjusted. His microscopes varied in magnifying power from 40 to 270 diameters. The lenses were of glass, with the exception of two or three of quartz, and were ground by Leeuwenhoek himself. The number of instruments he possessed was remarkable, there being 247 microscopes, two with double lenses and one with triple lenses, besides 172 lenses set between plates of metal. He used no tube or mirror, and his microscopes were much more simple in construction than one possessed by an Englishman, Hooke, who worked at the same time, which resembled in form the microscopes of to-day. Surpassing our modern laboratories in the elegance of his equipment, we find that one-half of his lenses were mounted in silver, and a number even in gold.

Leeuwenhoek's investigations covered a very wide field, and he left little unnoticed in the microscopic world. His observations were all set down in the form of letters to scientific bodies, chiefly the Royal Society of London, and the Academie des Sciences of Paris. He was a very prolific writer, but left no work such as Malpighi's "Anatome Plantarum" or Swammerdam's "Anatomy and Metamorphosis of Insects."

Perhaps his greatest single observation was capillary circulation. In 1628 Harvey had propounded the theory of vascular circulation, which was at that time well borne out by many facts, but it was left to Leeuwenhoek to demonstrate the actual passing of the blood from an arteriole, through capillaries, into a venule. Thus he forged the final link in the establishment of Harvey's great principle. Leeuwenhoek first saw capillary circulation in 1686 in the tail of a tadpole. His writings on this subject show that he had a clear idea of the minute vascular circulation.

Some of the discoveries attributed to Leeuwenhoek were in reality antedated by Malpighi, but Malpighi failed to carry his observations to a definite conclusion, and so the honour goes to Leeuwenhoek. For instance, Malpighi had observed the circulation of the blood in the lungs and mesentery of the frog, but had failed to apply it. Malpighi had also noted the existence of red blood corpuscles, but he described them as globules of fat, while Leeuwenhoek more accurately described them as round or oval discs, though he made the mistake of thinking that in man they were spheroidal.

Other outstanding observations of Leeuwenhoek were the branching of heart muscle fibres and the striped character of voluntary muscle fibres. Among his writings is a description of the crystalline lens, and of spermatozoa. He also turned his attention to the vegetable and mineral kingdoms. He made drawings clearly showing the cellular structure of plants, but made no comments.

On the theoretical side of his work, Leeuwenhoek displayed as great insight and clear thinking as he had shown dexterity and skill in his

investigations. He showed a mind far advanced for his time when he rejected the doctrine of spontaneous generation of life as it now exists. Though he cast aside the theory of spontaneous generation of life, we find him embracing the theory of "Emboitement" or "Preformation," holding to the belief that the ovum was simply a "nidus" in which the sperm was developed.

To these earliest devotees of histology is due the highest reverence we can pay to persistent and untiring effort in the face of enormous difficulties. Outstanding even among the leading minds of his time, Leeuwenhoek stands as a rare type of scientific discoverer. The flower of a scientifically uncultivated intellect, his genius overcame the handicaps placed upon him by his lack of training, and though in view of the work of his great contemporary, Malpighi, he can hardly lay claim to the title of Founder of Histology, his extensive research into practically all the branches of natural science has gained for him a just regard and a high status in the ranks of scientists of all ages. The possessor of a strong and robust constitution throughout life, his death occurred at the age of ninety-one, at the close of a very active career. The tale of his life is the remarkable account of a mind which threaded its own way through the mazes of a science as yet only in its infancy.

AN UNSCHEDULED COURSE

Dr. E. S. Ryerson, M.D., C.M.
Secretary of the Faculty of Medicine
Associate in Surgery and Clinical Surgery, University of Toronto

When a student graduates in Medicine, he will have learned more than is laid down in the curriculum. He cannot fail to realize that as an individual he is different from the freshman who was initiated five or six years before. The development of this inner self has taken place unconsciously as he has listened in the lecture theatre, worked in the laboratory, studied in his room or engaged in one or other of the athletic sports. Many students, unfortunately, fail to pay sufficient attention to this aspect of their education. They consider that they have done their part when they have conscientiously studied their Anatomy, Physiology, Clinical and other subjects, without realizing that the knowledge of all the subjects of the curriculum is merely a means towards an end and that this has been gained under the direction and supervision of professors and teachers. After graduation they have to depend solely upon their own efforts to further their knowledge by actual experience and if they have failed to learn how to educate themselves and how to judge the value of data and how to benefit themselves by experience they will soon sink into the rut of dull routine.

The characteristic which it is so essential for each student to acquire while an undergraduate is the ability to educate himself. This can only come through his own efforts, although a certain amount inevitably does come by the instinct through which he learns by experience. The quan-

tity, however, is so insignificant that it soon dies out and leaves the man in a state where he is unable to further improve himself.

The student in his undergraduate course should acquire, not only a knowledge of the principles in each and all of the subjects of the course, but the power of adjusting this knowledge from year to year. He must learn to be his own educator. He must learn to take advantage of his own personal experience. Such a power can only be obtained by seeking for it.

At the beginning of the course as a whole and of each of its component parts, the student is necessarily dependent on his instructors; as the course develops he should form opinions of his own and be able to judge efficiently as to the value of this or that theory, and then check up his conclusions by consultation with his clinician or teacher. In his final year when he is thrown on his own responsibility in the Hospital wards and has only a small number of fixed hours of instruction under supervision, he should be able to educate himself by personally solving the problems of diagnosis, prognosis and treatment of each case in the wards to which he is assigned. He should imagine that each patient is one for which he is personally responsible and whose life or death depends on the conclusions he reaches as the result of his study of the history, of his method of physical examination and of his interpretation of laboratory or X-ray findings. Only by meeting and solving living problems will he gain experience that will prove of value in the future.

In order to become a self-educator, a student must gradually eliminate the necessity for a teacher. Let the student make his objective at graduation not only the acquisition of the essential facts and ideas and theories necessary for the practice of medicine, but also the power and ability of educating himself, for only by such an accomplishment will he be able to do justice to himself, to be a credit to his profession and to do his part in preventing and relieving the sufferings caused by disease.

The tendency of students to implicitly believe in the truth of such and such a fact or idea, because a certain professor said so, or an author wrote it in a text book, results in the student subordinating the evidence of reason to that of authority, and in this way prevents the student from a realization of the importance of personally investigating by scientific methods the premises on which the statement was based and the process of reasoning by which a logical conclusion was arrived at. The student should give the same consideration and weight to the evidence the teacher presents in support of an idea, as he does to the conclusions, for by so doing he will be able to logically satisfy himself of their veracity. By the assumption of this attitude to his instructors and text books and authorities in general, the student will develop his own opinions, initiative and individuality, so that he will be able to stand on his own feet and have ideas of his own and not merely those of others. "What others may teach you may be good enough to assist you in your search for knowledge, but you should be able to think for yourself and not cling to the coat-tails of any authority, no matter how big sounding the title of the latter may be." (Paracelsus). "While teachers may be

real authorities in subject matter, they can never be anything more than assistants in the self development of their students. They should more openly assume this subordinate position, placing the primary responsibility upon the learner."

Knowledge cannot be given by the teacher; it has to be taken by the student. What goes on inside the mind of the student is of more importance to him than what was in the mind of the teacher who explains it or the author when he wrote his text-book. Since students cannot acquire the thoughts of their instructors any more than they can acquire their headaches, they have to find ways of generating thoughts within themselves by the help of their teachers. They must not expect to find knowledge ready-made, but realize that their task is to develop it, each out of his own experience. If their work is done on this principle, it will be in the active and not the passive voice. They bring up from their own observation and past experience whatever they already know that has a bearing upon the problem whose solution they are seeking; they question their fellow-students, the house doctors, the demonstrators to get the information that their specific undertaking requires them to get; they consult their books and libraries. In all this they are learning to work purposefully, to put two and two together to accomplish what they want, to pick out the important from that which has less significance, to make up their own minds, to organize their ideas, to use their own language, to doubt, to question and to prove.

Every student who gives the necessary attention to this unscheduled course of the curriculum, will inevitably acquire the power and ability to educate himself and such an accomplishment will insure his future success in life.

ENDOCRINOLOGY

A report of the meeting of the Academy of Medicine in Toronto, Nov. 12th, 1924

The speaker, Dr. Englebach of St. Louis, introduced his remarks by explaining that he had no wish to be dogmatic, and admitted that the knowledge of this subject was still elementary. He wished his statements to be considered for the most part as personal opinions, principally derived from the work of one clinic.

Hypothyroidism

Babies weighing more than 8 lbs. at birth he considers as probable cases of hypothyroidism, except in such cases as hydrocephalus, monsters and morons. Any baby weighing over 8 lbs. at birth should be X-rayed. If no epiphyses show in the knee and ankle joints, where epiphyses should be visible at birth, thyroid medication is indicated. A retarded epiphyseal appearance all over the body is characteristic of hypothyroidism. The skull is abnormally formed, and badly shaped eye sockets due to hypothyroidism, may be an indirect cause of cross-eyes at birth, owing to secondary malformation of the eyeball to fit the malformed socket.

Cretins are emaciated or overweight. The emaciated cretin may be due to thyroid deficiency plus anterior pituitary deficiency The overweight cretin may be due to thyroid deficiency plus posterior pituitary deficiency. The latter cases are commonest between 5 and 15.

Pituitary

Overweight in the juvenile ages is hypo-pituitarism of posterior lobe. The anterior lobe is usually involved as well, and if so there is poor development of the genitalia. This is, of course, not noticeable till puberty, so that if hypopituitarism is suspected before this age, it is advisable to treat for both anterior and posterior deficiency. Pure anterior lobe deficiency, evidenced by poor development of genitalia without increased weight, is less common than bilobar deficiency.

In diabetes insipidus results are obtained in 50 per cent. by pituitary extract.

Pigmentation may possibly indicate an early pituitary disorder.

In myxoedema is a dorsal pad of fat on hand. Not so in pituitarism.

In myxoedema is a "moon-shaped" face. In pituitarism the features are angular.

There is commonly a supra-clavicular fat pad in myxoedema.

Gonads

Ovarian deficiency is probably the most common of endocrine disorders. Overgrowth of long bones, plus amenorrhoea, means ovarian deficiency. In insufficiency of sex organs, epiphyseal junctions are delayed. In hypergonadism the epiphyses join early and growth stops as a result.

In a case of overgrowth of the mammae and mons in a boy, suspect sexual deficiency.

Hyperplasia of genitalia may be the result of a supra-renal cortex disorder, but the hyperplasia is not accompanied by overgrowth of hair, which the speaker believed to be a sign of adrenal deficiency.

The lecture was splendidly illustrated by photographs of actual patients of the speaker.

MODERN CONCEPTION OF SCARLET FEVER

A. H. Graham, M.B.

Fellow of International Health Board of the Rockefeller Foundation, Department of Hygiene and Connaught Laboratories, University of Toronto

Owing to the constancy with which haemolytic streptococci of one type or another have been found associated with scarlet fever, they have long been considered as a possible cause of the disease. Attempts to prove their causal relations have encountered many obstacles. It would be impossible in the scope of this paper to incorporate a complete review of all the literature that has been written regarding haemolytic streptococci in scarlet fever. Accordingly references to such works as have been outstanding have been made.

For many years attempts have been made to classify haemolytic streptococci and to produce curative sera.

Marmorck (1895)[1] first attempted to produce a curative serum by immunizing horses against streptococci, using living cultures for injection. The serum obtained was used in high dosage of 100-200 c.c. Moser and Von Pirquet (1902-1903)[2] concluded that streptococci from cases of scarlet fever were different from those from other diseases. They found that sera from convalescent cases of scarlet fever consistently agglutinated streptococci from scarlet fever patients, in low dilutions, and serum from other sources easily. Salge (1902-1903) obtained similar results, Aronson (1903), Neufield (1903), Weaver (1904), claimed that they could not find any specificity of streptococci in scarlet fever by agglutination or otherwise. "It is quite evident that various workers disagreed as to the possibility of a specific strain of streptococcus for scarlet fever. This attitude persisted until 1919 when, due to concentrated efforts by a number of investigators, consistent results were obtained in regard to a specific grouping of haemolytic streptococci in scarlet fever cases."

Dochez (1919),[3] Dochez, Avery and Lancefield (1919), Havens (1919), Tunnicliff (1920),[4] Gordon (1921),[5] Bliss (1922),[6] Eagles (1923),[7] found that by agglutination experiments, absorption of agglutinins; protection experiments, and to some extent by fermentation of sugars, the specificity of this group of haemolytic streptococci could be demonstrated.

In order to establish this specific group as the causative factor of scarlet fever, it was essential that the organisms should fulfil Koch's law. This was successfully carried out by Dick and Dick (1923)[8], who obtained their culture from an infected finger in a nurse on a scarlet fever ward. Successive attempts to reproduce the disease in animals were practically a failure. Following the injection of the animal a reaction occurred in the majority of cases, with an occasional rash and more rarely desquamation. Guinea-pigs were the most susceptible of all animals and a higher percentage of positive results was obtained. However, the clinical condition produced did not sufficiently resemble the disease to justify the designation of experimental scarlet fever.

Human volunteers were necessary for the solution of the problem, and accordingly several volunteers were experimented on. Active cultures were smeared on tonsils and pharynx and in one volunteer a typical case of scarlet fever was reproduced, which followed the usual course without complications. The series of human inoculations was limited to some extent due to financial remuneration required to compensate for the risk assumed by the volunteers. The streptococcus used was a pure culture and was recovered from the experimental case of scarlet fever and reproduced again in pure culture. This experiment definitely linked up the specific strain as the causative factor of the disease.

It was still necessary to show, however, whether the experimental case of scarlet fever had been caused by the haemolytic streptococci or a filtrable virus associated with it in culture. A second group of volunteers were used and inoculated with a culture which had been passed through a Berkfeld V filter. For two weeks following no reaction occurred and the group were again inoculated, using an unfiltered

culture. One volunteer developed a typical case of scarlet fever 48 hours later. This conclusively proved that the disease was produced by the haemolytic streptocci and not by a filterable virus.

Since the haemolytic streptococcus is present consistently in the throats of scarlet fever patients, and rarely found in the blood stream, the rash itself must not be produced by a direct action of the streptococcus on the skin. It was found that the haemolytic streptococci produced a toxin, which, on being absorbed into the blood stream, caused nausea, vomiting, fever and a typical rash. The haemolytic streptococci must be grown on suitable media for toxin production and the culture is filtered through a Berkfeld V filter. The filtrate contains the toxin and whose action can be destroyed by boiling.

This discovery was an important step and offered a scientific basis for future work. The toxin was the means for (1) developing a skin test for susceptibility to scarlet fever, (2) preventative immunization, (3) production of antitoxin.

The skin test, the Dick test, so called, in recognition of the original work of Dick and Dick, consists of the injection of scarlet fever toxin (dil. 1-1000), 1/10 c.c. intracutaneously on the anterior surface of the forearm. As a control toxin is used which has been inactivated by heating at 100° C. for one hour, 1/10 c.c. of 1-1000 dilution is injected intracutaneously at a point not less than 3 cms. from the test dose. These injections cause small wheals to be raised which disappear in a few minutes. Positive reactions usually begin to appear in from 4-6 hours after injection. At first they consist of small circles of erythema. This red area increases and reaches a maximum size and intensity in 18-36 hours. In less positive reactions the maximum is reached in 18-24 hours. The redness is frequently associated with some swelling of the skin. In the most strongly positive tests the reddened area continues to spread and swelling increases up to 36 hours after inoculation. Soon after reaching their maximum size and intensity the reactions begin to subside. Even the most strongly positive do not persist after 48 hours. The bright red colour becomes dull and begins to fade. The swelling disappears, leaving only a faintly yellowish area, which sometimes desquamates during 7-10 days following the test.

Reactions are classified according to their severity, that is, area of redness and intensity of induration and tenderness. Four types of reactions are as follows: (1) negative, (2) positive, (3) pseudo, (4) pseudo-combined. Readings should be made on the tests at the end of 18 hours since many reactions fade rapidly from 18-24 hours. Negative reactions are only seen as a faint pink streak along the course taken by the needle.

A moderately large series of tests have been carried out to determine susceptibility of individuals by age groups from birth until adult life. The results indicate that the reactions are similar in mother and offspring during the first six months of life. The reaction persists in the child from 6-9 months of age. The percentage of positive reactors is greatest at 4 years of age, 60-70 per cent. gradually decreases after 4 years until in adult life about 20 per cent. are susceptible.

Persons who have had the disease give a negative reaction in a majority of cases; showing that an immunity is conferred after an attack of scarlet fever. In active cases the test is strongly positive

during the first 2-5 days and gradually becoming less positive after this time until at 12-16 days a negative test is the rule to which there are a few exceptions.

Immunization by Use of Toxin

When small amounts of toxin are injected into susceptible persons they may develop general malaise, nausea, vomiting, fever and a scarlatinal rash. These symptoms appear within a few hours after the injection and disappear within 48 hours. By beginning with a small dose of toxin it is possible to immunize susceptible persons without causing a severe reaction. The toxin must first be carefully standardized on human beings in order to determine the skin test dose. No animals have as yet been found which are suitable for standardization purposes. Persons are immunized by injections of toxin at 5-7 day intervals, beginning with a small dosage. This work as yet is only in an early stage of development but a working standard has been adopted by certain men as follows:

(1) Adults, 100-250-500 skin test doses.
(2) Children, 100-250-250 skin test doses.

Experience has shown that immunization must be carried to a point of a negative skin test. The first change that appears in the skin tests during the course of immunization is a more rapid fading. Later, usually within a week after the last dose of toxin is given, it becomes entirely negative. The skin test should be repeated after 2-3 months as a safeguard.

Following an acute attack of scarlet fever it is evident that an immunity has been produced. For many years efforts have been made to produce curative sera and a few encouraging results have attended the use of these sera.

Antitoxin.—In 1917 Schultz and Charlton made the observation that serum from a convalescent scarlet fever patient, if injected in 1 c.c. amounts intracutaneously, would cause blanching in a scarlet fever rash about the site of injection. This was called the Schultz-Charlton phenomenon and the explanation offered as to its mode of action was the neutralization of the toxin in situ in the skin. Thus serum from convalescent patients contain anti-bodies which are specific and would explain the nature of inherited immunity in the offspring for a period of six months. This property of convalescent serum has made it of value in active treatment in certain cases of scarlet fever.

In a similar manner to immunization, antitoxin can be produced by injecting increasing doses of toxin into a horse at intervals of 5-7 days. The antitoxin thus obtained must first be carefully standardized by making mixtures with varying quantities of toxin of known strength, and the mixture used for skin tests on susceptible individuals, before being used for active treatment.

Antitoxin added to a proper volume of toxin or convalescent serum plus toxin when used as a mixture for skin tests in individuals who have previously had strongly positive reactions will now give negative reactions.

The broadened outlook as to the causation of scarlet fever, the production of a toxin and antitoxin, has opened up many new channels

for future research work on scarlet fever and many allied diseases. Knowledge of the present conditions may be practically applied with every hope of success.

Conclusions

1. Scarlet fever is caused by a specific strain of haemolytic streptococcus which can be distinguished from other strains by agglutination experiments, etc., but not as yet by cultures of morphological characteristics.
2. This specific strain produces a toxin which will produce on injection a typical scarlet fever reaction.
3. The Dick test is a reliable index of immunity susceptibility to scarlet fever.
4. In conjunction with active immunization with scarlet fever toxin it will help in control of scarlet fever.
5. It serves to indicate the susceptible persons who need immediate passive immunization with scarlet fever antitoxin.
6. The Dick test is an aid in diagnosis of doubtful cases of scarlet fever.
7. The scarlet fever toxin is neutralized in multiple proportions by antitoxic sera.
8. Specific character of toxin produced by many different strains of haemolytic streptococci may be studied by use of the skin test.
9. Streptococcus group will be further investigated in other diseases for purpose of prevention and treatment.
10. A new impulse to study of scarlet fever has been given by recent successful advances.

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TO live content with small means—to seek elegance rather than luxury, and refinement rather than fashion—to be worthy, not respectable, and wealthy, not rich—to study hard, think quietly, talk gently, act frankly—to listen to stars and birds, to babes and sages with open heart—to bear all cheerfully, do all bravely, await occasions, hurry never—in a word to let the spiritual, unbidden and unconscious, grow up through the common—this is to be my Symphony."—Channing.

FACULTY NOTES

Water Polo In water polo Jr. Meds. are still in the running, having defeated Sr. School.

Basket-ball Managers for Sr. and Jr. Meds. Basket-ball teams were recently appointed, and two more cup teams will soon be in the limelight.

Inter-year Indoor Baseball Inter-year Indoor Baseball is scheduled to start right after Christmas, and a cup presented by Dr. Gideon Silverthorne in 1905 has been resurrected for competition.

Senior Medical Dance The Fourth and Fifth Years are having a combined dance on December 17th at the Palais Royal. At the time of going to press final arrangements have not been completed, but the committee have a first class orchestra in view, and several unusual novelties are going to be introduced. A sit-down supper will be served. Tickets will probably be sold for $2.50 each.

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